Earth Science Operating Missions
2013 Senior Review Kickoff
Mission Team Q&A

December 16, 2014

AGU 2014 Fall Meeting
San Francisco Marriott Union Square, Savoy Room, 6-8 pm PST
Audio access
1-844-467-6272
Passcode 434967

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Senior Review Objective

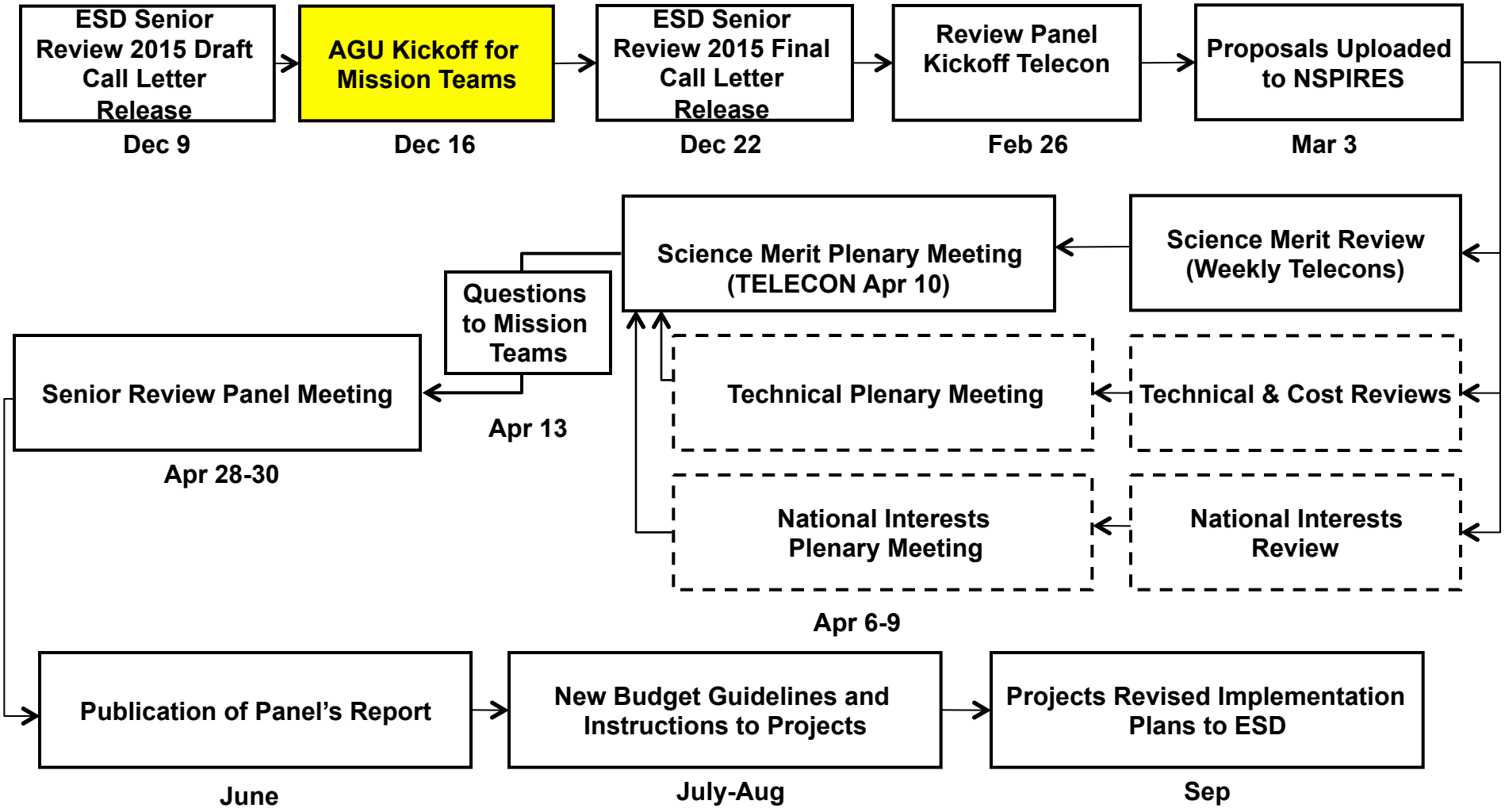
- Within available resources, maximize science value of the ESD on-orbit observing assets, while recognizing contribution to National (non-research) goals.
- The ESD Senior Review explicitly acknowledges
  - the importance of long term data sets and overall data continuity for Earth science research;
  - the direct contributions of mission data to national objectives, such as the routine use of near-real-time products from NASA research missions for applied and operational purposes by U.S. public or private organizations

No Change

Senior Review Schedule

- Schedule
  - Draft Call Letter — Dec 9
  - Mission Scientist Pre-Proposal Briefing @AGU — Dec 16
  - Final Call Letter — Dec 22
  - Proposals Due — Mar 3
  - National Interests Panel and Technical Review — Apr 6-9
  - Science Panel (Telecon) — Apr 10
  - Science Panel (Mission Presentations) — Apr 28 – 30
  - Science Panel Preliminary Findings to ESD — May 1
  - Science Panel Report — June
  - PPBE2017/Senior Review Budget Decisions — May – Jul
  - Program Scientist Review — July
  - Results to ESD Steering Committee — Aug
  - Guidance Letters to Missions — Aug
  - Mission Response — Sep 30

ESD Senior Review 2015 Flow



Process Improvement

- **What stays the same**
  - Focus on core mission; panel will not be asked to evaluate individual data products, but provide a value assessment of the suite of standard data products.
  - Evaluation process continues to be based on the standard ROSES evaluation process. Each mission has an assigned Lead Reviewer with 2 secondary reviewers. Major differences: eliminate conflicts of interest prior to panel formation; tweak standard rating definitions to be more applicable to missions; pre-panel meetings.
  - All-day telecon 2 weeks before mission presentations, to develop questions & topics for clarification by mission teams
  - Subpanels:
    - Chairmanship of National Interests panel by Applied Sciences with panel members from other agencies, states, and non-governmental organizations.
    - Continue technical sub-panel, chaired by Langley's Science Office for Mission Assessments (SOMA, same group who does the technical/mgt/cost evaluations of AO's for SMD).
    - Continue cost assessment by the Program Offices.

Process Improvement

- **What stays the same, continued**
  - Program Scientist Role:
    - Pre-review: help to establish priorities and scope during Steering Committees
    - Proposal writing: resource to mission teams on priorities, etc.
    - During Panel Reviews: Ex officio panel member to assist the panel in understanding the missions, with a seat at the table.
    - Post-review decisions: help formulate specific guidance to missions based on panel findings, participate in final decision-making Steering Committee.
  - Background briefings to Science Panel:
    - Mission timelines, showing future mission plans & dataset continuity.
    - Description of the MO & DA vs. Multi-Mission Ops (the NASA data centers) vs. Competed Science program structure.

Process Improvement

- **Modifications/Improvements**
  - Cost evaluations continue to be a problem; the new table introduced in last review will be re-used, but template may be adjusted to incorporate useful information from the standard NSPIRES budget sheet (last review's template in backup).
  - Panel questions to missions: I will provide a core set that all missions will answer to keep the focus of the questions on useful information, and to ensure consistent level of input data across the missions.
    - Technical question answers may be provided separately to technical panel chair.

Review Panel Structure

- **Science Panel** (10-12 members)
  - Primary evaluation panel
  - Chaired by a 2013 panel member
  - All Science Focus Areas & ESD disciplines (e.g. cryosphere, oceans…) will be represented.
  - Members will be recognized experts from the Earth science community; diversity essential.
  - Will be supported by Technical SubPanel, led by LaRC SOMA, who will brief findings to the Science Panel & deliver a written report.
  - Will be supported by Program Office program analysts to provide cost analyses.
- **National Interests Panel**
  - Chaired by ESD Applied Sciences
  - Seek input on applied & operational uses from
    - Civilian agencies: NOAA, USDA, FAA, DOI/USGS, EPA
    - Military/security: NRL, AFWRL, DHS, NRO, NGIA
    - States/NGO/Private Sector: ASPRS, Conservation International, National States Geographic Information Council, AIAA Remote Sensing Working Group
  - Will brief findings to the Science Panel & deliver written report.

No Change

NASA OIG Mission Operations Audit

NASA OIG Mission Operations Audit

- In 2014, the IG began an audit of SMD operating missions, citing the summary budget allocated to extended missions as approximately 10% of the SMD total allocation.
- Originally planning to audit a selected sample of extended missions, the audit re-focused its effort on the SMD Senior Review Process.
- No issues specific to the Earth Science, Heliophysics and Astrophysics Senior Review processes were identified; several recommendations were made for the Planetary division's process.
- One general finding: the stated mission extension paradigm of extended mission operations at 2/3 of the cost of prime mission was not implemented.
  - This paradigm has been quoted by Heliophysics and Astrophysics in their call letters.
  - Earth Science encourages reductions through continuous improvement, but acknowledges the need to maintain quality of a long-term consistent dataset.
- As a result of the audit, the SMD Management Handbook is being updated to improve consistency across the divisions. Task lead is from the Strategic Mgt Division.
- Bottom line: the ESD senior review process is unchanged, but there may be more emphasis on reducing costs in the future.

2015 Senior Review Scope

Evaluation Criteria

ESD's priority for the Mission Teams for the 2015 Review:
- *Quality standard data products that support scientific use and research.*
- *Support to the user community to ensure appropriate use of products.*

- **Science:**
  - Scientific merit of the mission datasets, based on their intrinsic value in research investigations by the community, relevance to ESD science goals, and data product maturity;
  - ***Quality trends of the standard data products***, value of long term data records and overall data continuity, and projected quality based on continuing mission performance, including any degradation of sensor or platform;
  - Secondary criteria:
    - Utility for operational and applied users
    - Cost effectiveness
- **Operational and non-research uses**:
  - Utility of the products for "applied and operational uses" that serve national interests, including: operational uses, public services, business and economic uses, military operations, government management, policy making, non-governmental organizations' uses, etc.
  - Evaluation factors: intrinsic value, frequency of use, latency.
- **Technical & Cost**:
  - Hardware status and performance, life expectancy.
  - Mission operations plans for health, safety and data collection.
  - Cost realism.

No Change

Proposed Rating Definitions for Senior Review

Excellent = Extend

A compelling mission of exceptional merit whose datasets are widely used, multidisciplinary and recognized as the standard for the Earth Science community. Continuation of the datasets at the same high level of quality is highly likely, data gaps are negligible, and mission is fully responsive to the priorities of the ESD science objectives. Numerous or significant strengths of the mission, with no major weaknesses.

Very Good = Extend

An important mission essential to more than one discipline for advancing ESD science objectives, and widely used by the community. Minimal data gaps that do not affect the long-term science record, continuation of the datasets at same level of quality likely. Mission is responsive to the priorities of ESD science objectives. Strengths outweigh any weaknesses.

Good = Extend

A competent mission that routinely provides a quality dataset, still widely used by the community. Datasets are documented and available to the community. Data gaps exist, but overall dataset capable of supporting long-term global change research/ESD science objectives in at least one discipline.

Fair = Extend conditional on actions

A nominal mission that produces a useful dataset that is subject to gaps or other flaws that may reduce its value for ESD science objectives or long-term global change research. Datasets continue to be used by members of the community, but require additional work or analysis to enable use. Weaknesses outweigh strengths.

Poor = Terminate

A mission with a dataset no longer used by the community.

Mission List: 10 missions in this year's Senior Review

Missions Included:

- Extended missions invited to propose: Aqua, Aura, CALIPSO, CloudSat, GRACE, OSTM, QuikSCAT, SORCE, Terra (missions with unsustainable budgets)
- Missions completing prime operations & new to the Senior Review process: Aquarius

Missions NOT included

- Missions in prime that will not be included in the 2015 Senior Review: GPM, SNPP, OCO-2
  - when their prime ops end, they will be granted extension to the next senior review in the PPBE guidance, to be confirmed at the End of Prime Mission Review.
- Extended missions in operation NOT invited for further extension, due to scheduled decommissioning: EO-1, TRMM
- Missions failed since 2013 Senior Review: Jason-1, ACRIMSAT

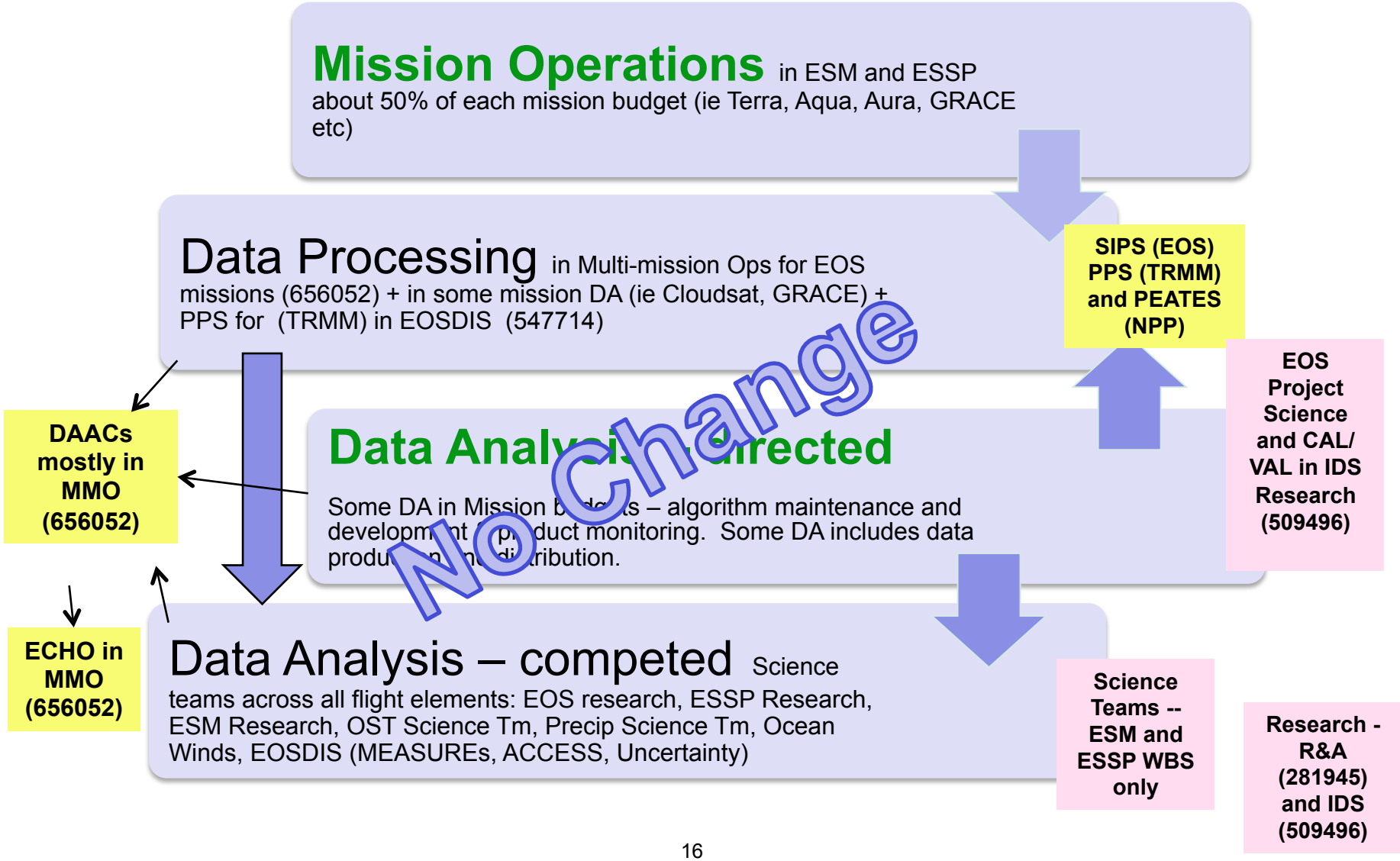
Other Topics

- **CERES DA** has been moved to a separate on-going 7120.8 project, Earth Radiation Budget Science. Terra & Aqua missions will still include the instrument as part of the proposal, but the budget will now be in the 'in-kind' contributions section, and will not need to be justified.
- **Education (STEM)** is no longer included in mission scope. Public & user community engagement is still included.

Future Reviews

- **Terra & Aqua existing algorithms in ROSES**. HQ will work with the mission teams & individual PI's to transition the A46 grants to the missions. The transitioned scope will be incorporated into 2017 Senior Review.
- **ISS Payloads**. Extensions need to be coordinated with ISS Program Office.

Program Structure – Elements and WBS



Mission Scope Summary

(based on 2013 proposals & mission input – Mission Teams, please send me corrections!)

Mission / Sensor	PI vs Facility	Mission Ops	Data Analysis	ROSES Competed Science	Science Data Systems: Routine Product Generation	Science Data Systems: Data Center (distribution & Archive)
Aqua		**ESMO**				
AIRS	*facility*	Instrument Ops JPL	implementation, maintenance and validation of all algorithms, development of L1 algorithms, instrument calibration & product validation	science algorithm development & maintenance for all L2 products	MMO/GES DISC	ESDIS/DAAC
AMSR-E	*facility*	Instrument Ops JAXA	End of mission reprocessing for final AMSR-E data set; also, Team Leader SCF for implementation, testing, and maintenance of any further algorithm developments funded by ROSES	algorithm development	MMO/SIPS	ESDIS/NSIDC
CERES	*PI*	Instrument Ops LaRC	FUNDED SEPARATELY -validation & quality assmt of all standard products, algorithm improvements and maintenance updates to existing data products, user documentation, maintenance of calibration algorithms, SCF's.	research only	DA-funded routine generation at DAAC	ESDIS/DAAC
MODIS	*facility*	Instrument Ops GSFC	maintenance and validation of Level 1 algorithms, product quality assessment & validation, instrument calibration & characerization	T&A Science Teams, algorithm development & maintenance for all UPPER level products	MMO/multiple SIPS	ESDIS/DAAC
Aquarius	*PI*	CONAE	Development, implementation, maintenance & validation of all algorithms	research only	DA funded	
Aura		**ESMO**				
HRDLS	*PI*	Instrument Ops NCAR			MMO/SIPS	
MLS	*PI*	Instrument Ops JPL	validation & quality assmt of standard products, algorithm improvements and maintenance updates to existing data products, user documentation, testing and delivery of software to the SIPS, maintenance of calibration algorithms, SCF's. The implementation and validation of additional products initially developed under	Experimental product development only	MMO/SIPS	ESDIS/DAAC
TES	*PI*	Instrument Ops JPL		Experimental product development only	MMO/SIPS	ESDIS/DAAC
OMI	*facility*	Instrument Ops KNMI & FMI	Project Scientist, TOMS heritage algorithms, science team support, instrument analysis; validation products	All US-developed products except TOMS heritage products	MMO/OMI SIPS	ESDIS/DAAC
CALIPSO	*PI*	**CNES** (Instr. Ops LaRC)	algorithm development, maintenance & validation for all products	ESSP Research	DA-funded routine generation at DAAC	DA-funded support from LaRC DAAC
CloudSat	*PI*	**USAF**	algorithm development, maintenance & validation for all products	ESSP Research	DA funded at CSU/CIRA	DA funded at CSU/CIRA
GRACE	*PI*	**DLR**	POD, algorithm development, maintenance & validation for all products	ESSP Research	DA funded at UTCSR	ESDIS/PODAAC (not DA-funded)
Jason-2/OSTM	*facility*	**NOAA NSOF & CNES**	Eng Cal/Val & POD, GPS OGDR & AMR exp product generation; Project Scientist	OSTST: core science data product algorithms	NOAA & CNES + DA for 2 exp products	NOAA CLASS, CNES & ESDIS/PODAAC
QuikSCAT	*Facility*	**LASP**	Project Scientist, instrument calibration, algorithms	OVWST: Development, validation, and scientific application of data or validation products	DA Funded SeaPAC @ JPL	ESDIS/PODAAC
SORCE	*PI*	**LASP**	all products	ROSES Solar Irradiance Science Team	DA funded: LASP/LISIRD	DA funded: LASP/LISIRD
Terra		**ESMO**				
ASTER	*facility*	Instrument Ops JAXA	Project scientist, coordination with Japanese science team, maintain & verify algorithms for standard data products, field campaigns	research products (e.g. volcano products)	MMO/LPDAAC	ESDIS/LPDAAC
CERES	*PI*	Instrument ops LaRC	FUNDED SEPARATELY - validation & quality assmt of all standard products, algorithm improvements and maintenance updates to existing data products, user documentation, maintenance of calibration algorithms, SCF's.	research only	DA-funded routine generation at DAAC	ESDIS/DAAC
MISR	*PI*	Instrument Ops JPL	algorithm development,maintenance, validation & quality assmt of all standard products	research only	MMO/LaRC DAAC	ESDIS/DAAC
MODIS	*facility*	Instrument Ops GSFC	maintenance and validation of Level 1 algorithms, product quality assessment & validation, instrument calibration & characerization	T&A Science Teams, algorithm development & maintenance for all UPPER level products	MMO/multiple SIPS	ESDIS/DAAC
MOPITT	*PI*	Instrument Ops NCAR	algorithm development,maintenance, validation & quality assmt of all standard products	Research only	NCAR SIPS	ESDIS/DAAC

2013 ESD Senior Review Missions – Funding Environment (1)

- Pool of funds available is the sum of all the missions' MO&DA, decreased by the assumption that some missions will experience mission-ending anomalies within the extension window (CloudSat, GRACE, QuikSCAT, and SORCE):
  - ESD intends not to terminate any mission still providing valuable datasets.
  - Continuing operations of these missions are consequently a lien on ESD's budget, beginning in FY16.

- National budget uncertainties: although we try to hold to the budgets allocated in the Senior Review process, Executive and Legislative Branch budget actions cause changes annually. ***Do NOT assume that today's baseline is the same as what was allocated in the last Senior Review guidance letter.***
  - All missions will receive a budget template with a target budget allocation, for most missions the targets will match the current agency budget "N2" allocation.
  - These are planning budgets, and should not be shared outside the mission proposal team.

2015 ESD Senior Review Missions – Funding Environment (2)

- Guideline Proposals Required
  - All missions will be issued a target baseline, and must submit proposals that match these targets.
- 'Optimal' Proposals allowed only for 'sustainable' scenarios
  - No new scope (no new product development, investigations, etc)
  - Optimal proposals will be accepted only if you can demonstrate that the provided baseline requires de-scopes that make the entire mission not worth continuing.
  - Technical narrative must describe the discrete activity or item enabled by the additional funding, and the benefits of the additional work.
- PPBE2017 budget submissions MUST MATCH your Senior Review proposals.
  - Unsustainable missions must all submit 'overguides' in the PPBE2017 that will match the target guideline/submission in the Senior Review proposal.

Call Letter Outline

- Objectives
- Panels
- Review Criteria/Instructions to the Panel
- Extended Mission Scope
- Funding Environment
- Instructions to Proposers
  - Science Section: science merit, data products, applied & operational use, programmatic elements.
  - Technical/Budget Section: technical status (inc. tech[illegible]data appendix) & mission operations, budget narrative (inc. mandatory form[illegible]
- Appendices & Attachments
- Proposal Submission
- Panel meetings
- Presentations to Pa[illegible]el
- After Panel Meets
- Schedule
- Further Information & Attachments (e.g. WBS dictionary, budget template)

No Change

Proposed Modifications to Proposal Formats

Budget Templates

- Tables I, III no change
- Table II, add workforce to be in same table as budget
- Table IV, break-out workforce by WBS
- Table V, workforce only data (no labor dollars), but also include travel, and list other direct charges by purchase type, contract, etc. No overhead or fees to be included, or no bottom line total.

Appendix A

- Add a summary table with at least 3 columns: Data Product Name, Description, Algorithm Source (ROSES or DA).

Proposed Modifications to Budget Templates

Table II

Table II Approved Budget by WBS and Center

		FY16			FY17			FY18			FY19		
Center **GSFC**		**$K**	**FTE**	**WYE**	**$K**	**FTE**	**WYE**	**$K**	**FTE**	**WYE**	**$K**	**FTE**	**WYE**
	4.0 Science												
	Science (other than labor)	$784.00											
	FTE Labor	$34.00	3									4	
	WYE Labor	$1.00		4									1
	7.0 Mission Operations												
	Mission Ops (other than Labor	$813.00											
	FTE Labor	$3.00	1										
	WYE Labor	$4.00		2									
	Total*	$1,639.00	4	6	$0.00	0	0	$0.00	0	0	$0.00	4	1
Center **JPL**		**$K**	**FTE**	**WYE**	**$K**	**FTE**	**WYE**	**$K**	**FTE**	**WYE**	**$K**	**FTE**	**WYE**
	4.0 Science												
	Science (other than labor)	$2,075.00											
	FTE Labor												
	WYE Labor	$2.00											
	7.0 Mission Operations												

Table IV

Table IV Workforce by Center

		FY16	FY17	FY18	FY19	FY20
Center:	**GSFC**					
	4.0 Science	**10.1**	**8.1**	**8.1**	**8.1**	**8.1**
	Civil Service FTEs	0.2	0.2	0.2	0.2	0.2
	WYEs On/Near Site	2.0				
	Other WYEs-- Offsite	7.9	7.9	7.9	7.9	7.9
	7.0 Mission Operations	**2.0**	**0.0**	**0.0**	**0.0**	**0.0**
	Civil Service FTEs	1.0				
	WYEs On/Near Site					
	Other WYEs-- Offsite	1.0				
	Total*	**12.1**	**8.1**	**8.1**	**8.1**	**8.1**
Center:	**JPL**					
	4.0 Science	**3.0**	**8.0**	**8.0**	**8.0**	**8.0**
	Civil Service FTEs	0.0	0.0	0.0	0.0	0.0
	WYEs On/Near Site	3.0	8.0	8.0	8.0	8.0

Proposed Modifications to Budget Templates

MISSION X	123456						
Supplemental Budget Narrative Table FY16 Only							
Major Duties/Activities	Deliverables	Travel	Contracts	Purchases	ODCs (list)	FTE (CS Only)	WYEs
Science WBS element 4.0							
Center :							
Task 1		$ 3.0	$ 4.0	$ 4.5	$ 5.0	1.0	2.0
Task 2							
Task 3 etc							
Center :							
Task 1							
Task 2							
Task 3 etc							

Requested Feedback

- Are the evaluation criteria clear? Suggestions for rating definitions?
- Is your mission's MO&DA vs Data Systems vs ROSES description correct?
- Where is more clarity needed in the Call Letter?
- Suggestions for additional process improvements?
- QUESTIONS & COMMENTS

For More Information & Comments:
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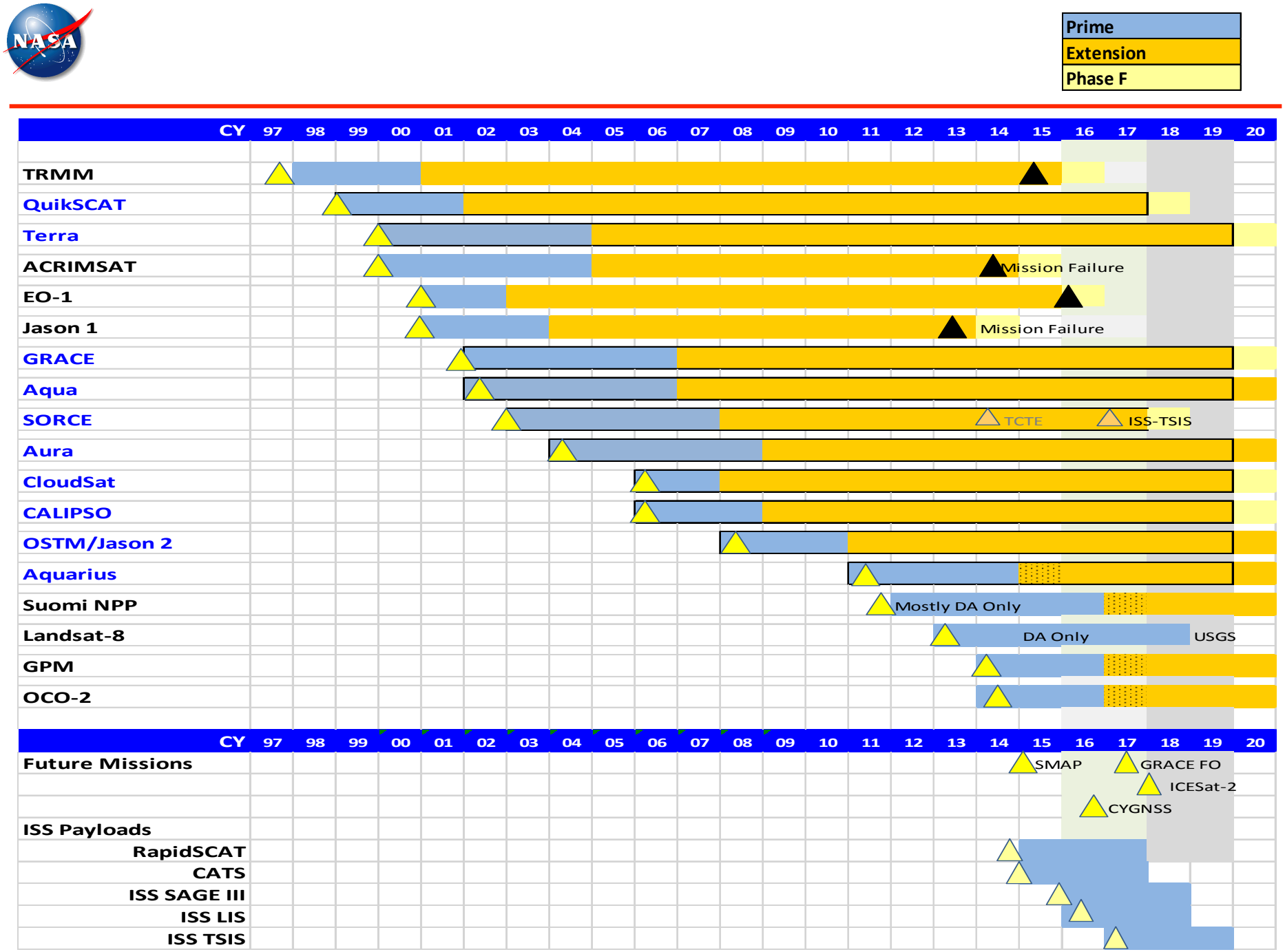
Backup


Prime
Extension
Phase F
CY 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20
TRMM
QuikSCAT
Terra
ACRIMSAT
Mission Failure
EO-1
Jason 1
Mission Failure
GRACE
Aqua
SORCE
TCTE
ISS-TSIS
Aura
CloudSat
CALIPSO
OSTM/Jason 2
Aquarius
Suomi NPP
Mostly DA Only
Landsat-8
DA Only
USGS
GPM
OCO-2
CY 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20
Future Missions
SMAP
GRACE FO
ICESat-2
CYGNSS
ISS Payloads
RapidSCAT
CATS
ISS SAGE III
ISS LIS
ISS TSIS